Course Syllabus: MAT 210 – Probability and Statistics

Fall Semester 2013, Section 1

Instructor: Ulrich Hoensch, Ph.D.

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- Office Phone: (406)-657-1126
- Office Hours:
  - Monday 8:00 a.m.-10:00 a.m. and 1:00 p.m.-2:00 p.m.
  - Tuesday 1:00 p.m.-2:00 p.m.
  - Wednesday 8:00 a.m.-10:00 a.m. and 1:00 p.m.-2:00 p.m.
  - Thursday 1:00 p.m.-2:00 p.m.
  - Friday 8:00 a.m.-10:00 a.m.

  and other times by appointment.

Class Information

- Credits: 3 semester hours
- Class Meetings: Tuesday, Thursday 2:30 p.m. - 3:45 p.m.
- Room: Morledge/Kimball 125
- **Moodle URL:** moodle.rocky.edu; use your general Rocky user name (first.last@rocky.edu) and corresponding password.
- Moodle Course: MAT210.001 Probability and Statistics; Course Enrollment Key: **Correlation**
- Class Web Page: `www.rocky.edu/~hoenschu/FS_2013/MAT210/Section01/main.html`

Text/Calculator Moore/McCabe/Craig, *Introduction to the Practice of Statistics*, Seventh Edition, W.H. Freeman (recommended); **an advanced statistical calculator such as the TI-84 Plus or Casio fx-9750GA PLUS is required** (ask instructor when in doubt).

Course Description This course provides a non-calculus-based study of discrete probability theory and its statistical applications. Distribution theory and its applications in hypothesis testing and setting confidence intervals are discussed. Prerequisite: MAT100 or satisfactory score on a placement exam.

Rationale MAT 210 can be used to fulfill part of Rocky Mountain College's Mathematics General Education Requirement; it is a highly recommended course for students majoring in sciences requiring data collection or analysis.

Course Objectives At the completion of MAT 210, students will be able to:

(1) Categorize, organize and graphically represent data.

(2) Compute sample statistics such as the mean, median, variance and standard deviation, and others.

(3) Compute probabilities using a variety of techniques, including standard probability distributions.

(4) Model real-world situations using both discrete random variables and normal distributions.

(5) Compute confidence intervals for population parameters, such as means and proportions.

(6) Perform hypothesis testing for population parameters, including one-and two-sample tests, and formulate convincing arguments using inferential statistical methods.

(7) Perform linear regression and analyze the significance of its results.

(8) Collect and analyze real-world data, and convincingly present results using the appropriate statistical vocabulary.

(9) Assess the virtue and validity of statistical methods and recognize the limitations and inappropriate use of statistics.

(10) Perform statistical data analysis using *Microsoft Excel*.

Methods of Evaluation Students will be evaluated based on the following evidence.

- Tests, in-class assignments and Excel homework assignments.
- Attendance record, timeliness, the amount of courtesy and respect extended towards fellow students and the instructor.
- Ability to independently and critically read the textbook, and apply the knowledge thus acquired.
- Level of academic and personal honesty and integrity.

Criteria for Grade Assignment To receive a passing grade, a student must show evidence that she/he is able to successfully perform the tasks laid out as course objectives (see above). Furthermore, students must attend all class meetings, arrive on time and exhibit appropriate classroom and social behavior. More specifically, a student is required to have accrued at least 60% of possible points to meet these criteria (see below). In addition, all submitted work must be the student's own work, or if it is not, names of sources or collaborators must be identified.

Possible points will come from:

- **Tests** Four one-hour, in-class tests, each worth 100 points, for a total of 400 points. Here students must submit only their own work. Tests will be *open book* tests: students will be allowed the use of a calculator, the textbook, their class notes, previous assignments, and, if they wish, other handwritten or printed materials.

- **In-Class Assignments** In most, if not all class meetings, graded assignments will be given. They are worth a total of 200 points. Students should be able to complete these assignments during the class meeting; if not, they may be turned in no later than two weeks from when they were issued (cf. the class policies below). **These in-class assignments (worksheets) must be submitted through the Moodle course room.**

- **Homework** Two Excel homework assignments for a total of 100 points. The Excel assignments are worth 50 points each. They require the use of *Microsoft Excel*. Students are responsible for gaining access to personal or campus computers that are functional and adequately equipped with the software and hardware (including a printer) that is required to complete these assignments. Homework must be turned in on the due date at the beginning of the class period.

This amounts to a total of 700 possible points. The following grading scale will be used to assign grades.

A: 90%, or more B: 80% - 89% C: 70%-79% D: 60%-69% F: less than 60% of possible points.

Instructional Methods and Experiences This is a small-class lecture with in-class practice sessions. Student participation in the lecture is encouraged, group work is encouraged for the in-class work. Study groups outside of class are strongly recommended. However, completion of homework assignments must be done independently by each student.

Class Policies Students are required to attend all class meetings and complete all assignments. **All worksheets must be submitted in the Moodle course room within two weeks of being issued. Late worksheets or homework will not be corrected and will receive no credit, regardless of circumstances or personal emergencies.** Other in-class assignments, including tests and exams, must be completed in the time allotted by the instructor. All work on tests and exams must be the student's own work, and may only be obtained through the use of allowed tools. Tests and exams may only be made up if the instructor is notified in advance of qualified absences. Qualified absences are limited to the following: (a) activities connected with Rocky Mountain College programs; (b) grave illness (in which case a doctor's note is required); (c) a family or personal emergency, or due to force majeure. In case (a), students must inform the instructor prior to their absence. In cases (b) and (c) above, students may be excused from assignments if they notify the instructor immediately after their absence.

College Academic Policies Students must abide by all Academic Integrity Policies of the College. See `http://www.rocky.edu/academics/course-catalog/FormsPolicies.php` for details.

Tentative Schedule and Topics Covered

Date	**Section/Topics/Remarks**
Tue Aug 27	**First Day of Class**, 1.1: Displaying Distributions with Graphs
Thu Aug 29	1.1: Displaying Distributions with Graphs
Tue Sep 03	1.2: Displaying Distributions with Numbers
Thu Sep 05	1.2: Displaying Distributions with Numbers
Tue Sep 10	1.3: Density Curves and Normal Distributions
Thu Sep 12	2.1: Scatterplots; Sec. 2.2 Correlation
Tue Sep 17	2.3: Least-Squares Regression
Thu Sep 19	**Test 1**
Tue Sep 24	2.5: Data Analysis for Two-Way Tables; 2.6: The Question of Causation
Thu Sep 26	3.1: Design of Experiments; 3.2: Sampling Design; **Excel Project 1 Due**
Tue Oct 01	3.3: Toward Statistical Inference; 3.4: Ethics; 4.1: Randomness
Thu Oct 03	4.2: Probability Models; 4.3: Random Variables
Tue Oct 08	4.4: Means and Variances of Random Variables; 4.5 Gen. Probability Rules
Thu Oct 10	**Test 2**
Tue Oct 15	5.1: Sampling Distributions for Counts and Proportions
Tue Oct 22	5.2: Sampling Distributions for a Sample Mean
Thu Oct 24	6.1 Estimating with Confidence
Tue Oct 29	6.2 Tests of Significance
Thu Oct 31	7.1 Inference for the Mean of a Population
Tue Nov 05	7.2 Comparing Two Means
Thu Nov 07	**Test 3**
Tue Nov 12	8.1 Inference for a Single Proportion
Thu Nov 14	8.2 Comparing Two Proportions
Tue Nov 19	9.1 Inference for Two-Way Tables
Thu Nov 21	9.3 Goodness of Fit
Tue Nov 26	10.1 Simple Linear Regression
Tue Dec 03	11.1 Inference for Multiple Regression
Thu Dec 05	12.1 Inference for One-Way Analysis of Variance
Wed Dec 11 10:00 a.m.- 12:00 noon	**Test 4**
Wed Dec 11 12:00 noon	**Excel Project 2 Due in Morledge/Kimball 118**